# DCS 6000

*User Manual*

**Digital Conference System**

## CU 6010 Central Unit

**Central Unit for series DCS 6000 Voting Units, Microphone Units, Interpreter Units, Ambient Noise Microphone, Channels Selectors and Audio Output Units**

**Danish Interpretation Systems** **DIS**

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# Important

## Compliancy

The equipment has been tested and found to comply with the limits of the following standards for digital devices:

- EN55103-1 (Emission)
- EN55103-2 (Immunity
- EN60065 safety
- UL6500 safety
- FCC rules part 15, class A (Emission)

This device complies with part 15 of the FCC rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in residential, commercial or light industrial environments. The equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the user manual it may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

## Safety

Check that the voltage of your local power supply is within the operating voltage of the unit (100-240V AC). If a voltage conversion is required, consult your DIS dealer or qualified personnel.

Should any liquid or solid object fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it further.

Set the Power switch to OFF if it is not used for several days.

**The equipment must be connected to earth**

## Installation precautions

Allow adequate air circulation to prevent internal heat built-up. Do not place the unit on a surface (rugs, blankets, etc.) that may block the ventilation holes.

Do not install the unit in a location near heat sources such as radiators or air ducts, or in a place exposed to direct sunlight, excessive dust or humidity, mechanical vibration or shock.

To avoid moisture condensations do not install the unit where the temperature may rise rapidly.

When installing the unit inside a 19” rack, observe that the rack is properly ventilated. The maximum allowed temperature inside the rack is 40 °C.

## Cleaning & Repacking

To keep the cabinet in its original condition, periodically clean it with a soft cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution. Never use organic solvents such as thinners or abrasive cleaners since these will damage the cabinet.

Save the original shipping cardboard box and packing material; they will become handy if you ever have to ship the unit. For maximum protection, re-pack the unit as originally packed from the factory.

## Warranty

The unit is minimum covered by 12 months warranty against defects in materials or work-manship.

# Description of the DCS 6000 system

## Features

The DCS 6000 system has the following main features:

- Fully digital
- Excellent sound quality
- "State of the Art" fully digital integrated interpretation, discussion and voting system offering interpretation, language distribution, conference microphone and voting facilities with attendance check with Chip Card ™.
- New, unique digital DATA and AUDIO bus.
- 39 incoming channels (8 floor channels + 31 interpreted channels) and one Line input.
- 33 distributed channels (2 x floor + 31 interpreted channels)
- The Delegate and Interpreter units are powered and controlled by the CU 6010 Central Unit, which drives up to app. 200 units on 4 chains.
- EX 6010 Extension Units or PS 6000 Power Supplies available if more units are required
- A total of 4000 units (delegate and/or interpreter units) can be connected to the system.
- Using screened CAT5 or CAT5e cabling (FTP or STP) ensuring a very cost effective installation and easy set-up of portable systems
- Firmware in Delegate units, Interpreter Units, Central Units etc. upgradeable through serial PC-connection (RS232 or RS422)
- Can be operated with or without a PC.
- Added functionality and comprehensive features provided by SW 6000 software package running on PC
- RS232/RS422 connection on CU 6010 for external operation of the system of a PC or control system such as AMX or Crestron

The SW 6000 is an optional software package, which expands the functionality of the DCS 6000 system. The software runs on standard computer technology (Standard PC with Windows 2000 or XP).

Main features of the SW 6000 are:

- Microphone management
- Mimic panel operation
- Interpretation management
- Voting management
- Message handling
- Agenda handling
- Data stored on SQL data base for easy export/import of data as well as easy links to external databases
- Multi language user interfaces
- Supports different User types with different priorities, user interfaces and control possibilities
- Variety of printing facilities such as speaker's log, voting results, delegates list etc.

# System components

The CU 6010 Central Unit supports all available units in the DCS 6000 series:

## Central equipment etc.

| | |
|---|---|
| EX 6010 | Extension Unit |
| PS 6000 | Power Supply |
| AO 6008 | Audio Output box |
| RP 6004 | Repeater for four chains |
| JB 6002 | Junction Box with 2 outputs |
| JB 6004 | Junction Box with 4 outputs |

## Interpreter equipment

| | |
|---|---|
| IS 6032P | Interpreter Set |
| IS 6132P | Interpreter Set |
| LS 6032P | Interpreter Loudspeaker |

## Conference equipment and channel selectors

| | |
|---|---|
| CS 6032FV/H | Channel Selector (flush mounted) |
| CM/DM 6010P | Conference Unit (portable) |
| CM/DM 6020P | Conference Unit (portable) with XLR microphone connector |
| CM/DM 6070P | Conference Unit (portable) with two built-in channel selectors |
| CM/DM 6090P | Conference Unit (portable) with two built-in channel selectors and XLR microphone connector |
| CM/DM 6060F | Conference Unit (flush mounted) with one built-in channel selectors |
| CM/DM 6510F | Conference Unit (flush mounted) with Chip-card and 3 voting buttons |
| CM/DM 6560F | Conference Unit (flush mounted) with one built-in channel selector, Chip-card and 3 voting buttons |
| MU 6040C/D | Microphone Unit for use with customised front plate with Loudspeaker, Microphone and Buttons. Available in Delegate (D) and Chairman (C) version |
| AM 6040 | Ambient Noise Microphone |

# Operating instructions

## CU 6010 Central Unit

### General description

The CU 6010 Central Unit for the DCS 6000 is the heart of the system. One CU 6010 is needed in each DCS 6000 system. The CU 6010 consist of three main parts:

- Main processor board with Power PC and DSP
- DCS-LAN Network Control Card with 4 individual DCS-LAN outputs
- 4 individual Power supplies
- LCD display and buttons for system settings

The design with built in power supply makes the unit suitable for running a small system alone or to be the Central Controller for a large system.

### Features

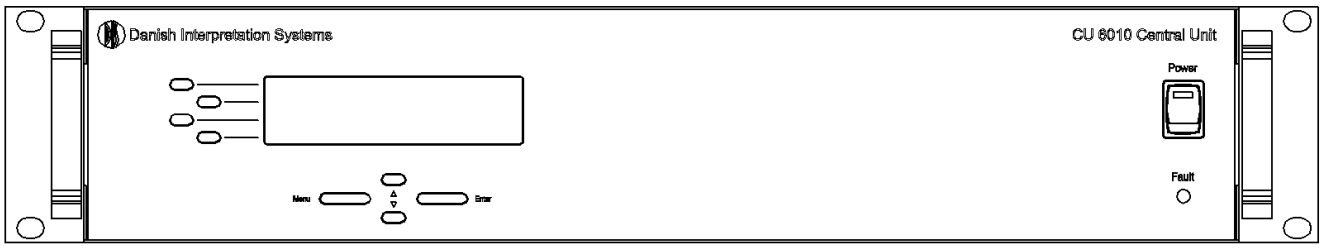
The main features of the CU 6010 Central Unit are:

- Controls up to 1000 units (Microphone units, Interpreter units or other controllable units). This number does not include Channel Selectors, Repeaters etc. In practical use there are no limits for the number of Channel Selectors in a system.
- Designed for 31 interpreted channels and 8 open microphones
- Operated either stand alone or from an IBM compatible PC with SW 6000 software running under Windows 2000 or XP.
- Built in Power Supplies for app 200 units (Delegate) or app. 600 Channel Selectors
- 4 outputs for connection to Delegate Units, Interpreter Units etc.
- Delayed switching on of power to the four chains, to minimise the total ‘in-rush’ current on the Mains supply.
- Designed in a standard 2HE 19” cabinet.

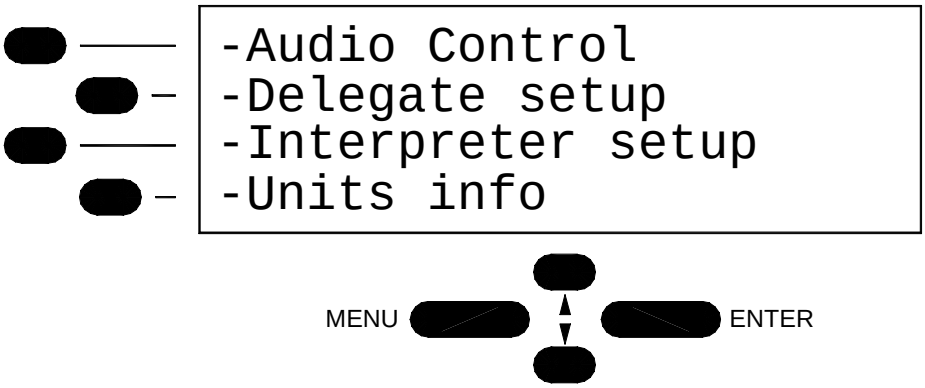
### User Controls, indications & connectors

#### Front plate layout

The front plate layout of the CU 6010 Central Unit consist of a large illuminated LCD display and 8 buttons for setting up/controlling the system:



❑ ***Details of display***




## Front plate controls

The CU 6010 Central unit features the following controls and display:

❑ ***Power switch***

Switches power on to the whole system. When power is switched ON at the CU 6010 any connected EX 6010 Extension Units will automatically be powered up. An indication in the switch is lighting, when power is switched ON

❑ ***Fault LED***

This indication lights up, if the internal power supply is malfunctioning i.e. because of overheating or overload of a chain.

The Fault LED will always light up some seconds after the unit is switched on caused by the delayed switching on of the four supplies.

As a warning the light is flashing at an internal temperature above 45°C. At a temperature above 55°C or if one of the DCS-LAN outputs is supplying no voltage, the LED is lighting constantly.

Please note that the maximum ambient temperature for the CU 6010 is 40 deg. Celsius.

❑ ***LCD Display***

This display is used for information purposes and set-up purposes.

❑ ***Buttons***

The buttons below and to the left of the display are used when stepping through the different menus and for setting up the system:

- ***Four select buttons***

Four buttons placed on the left-hand side of the display. Each button is associated with a line pointing towards a text line in the display. This indicates, that pushing the button ‘selects’ the functionality.

- ***Enter button***

The Enter button is used, when a selection is made in the Main Menu. Pressing the Enter button concludes the selection made, and at the same time it indicates a confirmation of the possible changes made within the selection. The Menu system returns to the previous menu. Notice, that some changes are applied immediately, and confirmation is thus not required.

- ***Menu button***

The Menu button is also used, when a selection is made in the Main Menu. The Menu button concludes the selection, but in contrast to the Enter button, the Menu button does not confirm a possible change made within the selection. Instead, the Menu system returns to the previous menu without confirming changes, if confirmation is required.

- ***Up (? ) and Down (? ) buttons***

The Up and Down buttons are used to scroll through menu items, or to increase/decrease values within a selection.

## Symbols

The following symbols are used on the LCD display:

❑ **'-'**

The dash symbol ('-') preceding a line of text identifies a submenu or a changeable parameter. The submenu or parameter can be selected by pressing the corresponding select button.

❑ **'>'**

The '>' symbol preceding a line of text identifies a selected parameter. The parameter can be changed by pressing the up and down buttons. The '>' symbol is shown as long as the value of the parameter currently used is the same as the value shown in the display.

❑ **'*'**

The star symbol '*' preceding a line of text identifies a selected parameter, where the value has been changed, but not yet confirmed. The changed value can be confirmed by pressing the Enter button, or it can be dismissed by pressing the Menu button.

❑ ***'? ? '***

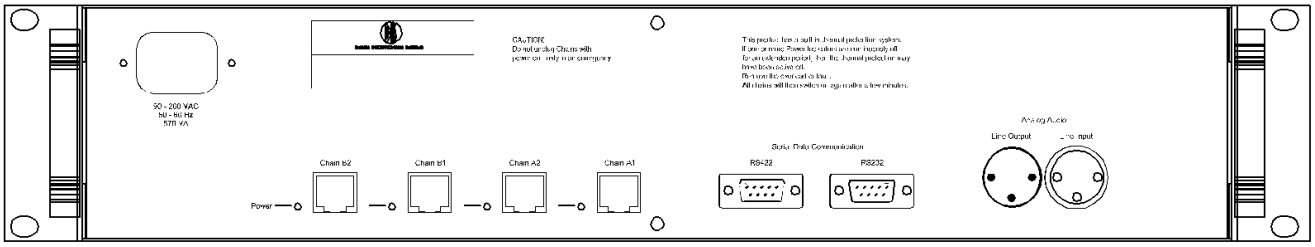
The up and down symbols shown in the right side of the display (up is shown in the first line and down is shown in the last line) indicates that the current menu consists of more than 4 menu items. It is therefore necessary to use the up and down buttons to scroll through menu items.

## Indications

❑ ***Cursor***

The cursor is used on the LCD display to indicate, when a value is being changed. For a parameter that is subject to a change, the cursor is placed at the value of the parameter, indicating that it is about to be changed.

## Back Panel Layout




## Back Panel Connectors

❑ ***Mains Power connector***

Connection for mains power. See specs.

❑ ***Analog Audio Line input***

XLR Input connector.

For connection of external Line input signal i.e. the Floor (Speaker) signal from another Conference Microphone System or audio mixers. See specs.

❑ ***Analog Audio Line output.***

XLR Output connector.

This connector carries the "Floor" signal. It is used either for recording purposes or for feeding signal to an external loudspeaker system. See specs.

❑ ***Serial Data Communication RS232***

D-Sub9 connector

RS232 Serial connection for communication to PC etc. Either the RS232 or the RS422 can be used.

- ***Serial Data Communication RS422***

D-Sub 9 connector

RS422 Serial connection for communication to PC etc. Either the RS232 or the RS422 can be used.

- ***Chain A1 & A2***

RJ45 connector, 2 pieces

DCS-LAN connectors for connection to DM/CM 6xxx, IS 6032, IS 6132, CS 6032, EX 6010, AO 6008 etc. For connecting Interpreter Sets for up to 16 languages. If more languages are required, Interpreter sets for those languages have to be connected to Chain B1 or B2.

- ***Chain B1 & B2***

RJ45 connector, 2 pieces

DCS-LAN connectors for connection to DM/CM 6xxx, IS 6032, IS 6132, CS 6032, EX 6010, AO 6008 etc. For connecting Interpreter Sets for up to 16 languages. If more languages are required, Interpreter sets for those languages have to be connected to Chain A1 or A2.

- ***Power LED's***

Those LED's light up when Power is available on the connector next to the LED and only if the voltage is over 24V (not overloaded).

## System settings

Control of the system settings is done through selections made in the main menu. Pressing the Menu button will shown the Main menu:

```
-Audio Control          ?
-Delegate setup
-Interpreter setup
-Units info             ?
```

The complete contents of the main menu comprise the following entries:

- Audio Control
- Delegate setup
- Interpretation setup
- Units info
- Configuration
- RS232 (RS422) setup
- Firmware version

A selection is made in the Main menu by scrolling through the menu items with the Up/Down buttons, and pressing the Select button associated with the desired menu item. When scrolling through the menu items, the Main menu wraps around the list of menu items, i.e. passing the last menu item makes the first menu item appear, and likewise when passing the first menu item.

Pressing the Menu and Enter buttons does not have any effect in the Main Menu.

### Audio Control menu

By pressing the select button for the "Audio Control" menu adjustment of the audio levels becomes possible:

```
-Loudspk volume: -17dB ?
-LineOut volume:  10dB
-Mic->Loudspk:     0dB
-Mic->LineOut:     3dB ?
```

By pressing the first select button, adjustment of the loudspeaker volume is selected. This is indicated by the '>'-indicator, and the cursor starts flashing at the value:

```
>Loudspk volume: -17dB ?
-LineOut volume:  10dB
-Mic->Loudspk:     0dB
-Mic->LineOut:     3dB ?
```

The up/down buttons can now alter the value of the loudspeaker volume. A change made to the loudspeaker volume takes effect immediately. The

volume is changed in steps of 1 dB. The value of 0 indicates 'standard' setting.

Pressing the Menu or the Enter button ends change of loudspeaker volume. Change of other audio levels is done the same way as for the loudspeaker volume in steps of 1 dB. All changes take effect immediately.

The Audio Control menu comprises the following complete list of adjustment items:

- ***Loudspk volume***

Master Loudspeaker volume, the audio level of the loudspeakers of the delegate microphone units.

Values: {Off, -40, -39, …, -1, 0}

- ***LineOut volume***

The audio volume of the 'LINE OUTPUT' signal from the CU.

Values: {Off, -40, -39, …, 19, 20}

- ***Mic->Loudspk***

Attenuation/Gain of the audio signal transmitted from speaking delegate microphones to the delegate microphone unit loudspeakers.

Values: {Off, -40, -39, …, 19, 20}

- ***Mic->LineOut***

Attenuation/Gain of the audio signal transmitted from speaking delegate microphones to the 'LINE OUTPUT' signal.

Values: {Off, -40, -39, …, 19, 20}

- ***LineIn->Loudspk***

Attenuation/Gain of the audio signal transmitted from the 'LINE INPUT' to the loudspeakers of the delegate microphone units.

Values: {Off, -40, -39, …, 19, 20}

- ***LineIn->LineOut***

Attenuation/Gain of the audio signal transmitted from the 'LINE INPUT' to the 'LINE OUTPUT'.

Values: {Off, -40, -39, …, 19, 20}

- ***LineInlevel Adj***

Attenuation/Gain of the XLR audio input signal from the 'LINE INPUT'.

Values: {Off, -40, -39, …, -1, 0}

## Units Info Menu

Selecting "Units info" from the Main menu, the Units info menu is entered:

```
-Display Chain info
-Display Unit types
```

- ***Display Chain Info***

Selecting the first select button makes the system enter the Chain Information display. This display looks like this:

```
Chain A f/e:          2/2
Chain B f/e:          2/3
Total   f/e:          4/5
f:found, e:expected
```

The Chain info menu displays information to the user about units connected to the CU. The information is divided into Chain A, Chain B and total. Found units are connected units, where the communication is maintained, and expected units comprises all units, which are defined in the 'Configuration'.

Menu button or Enter button leaves this screen.

'Configuration' is described later in the section 'Configuration Menu'.

- ***Display Unit types***

Selecting the Display Unit types in the Units info menu brings up the Unit type display:

```
Delegate units:    250    ?
Chairman units:      4
Interpreter units:  50
Audio Output units:  7    ?
```

Information about 5 different unit types is supported:

- Delegate units
- Chairman units
- Interpreter units
- Audio Output units
- External Controller

This menu simply displays the number of present units. For external controller it is indicated by 'ON' or 'OFF' whether an external PC is connected and communicating (alive) via the RS232/RS422 connection to the CU.

Menu button or Enter button leaves this screen.

## Interpretation setup menu

The "Interpreter setup" menu looks like this:

```
-Channel setup
-Language setup
```

❑ ***Channel Setup***

By pressing the first select button, the "Channel setup" menu is shown:

```
 No. of channels:     27
```

This menu displays the number of interpreter channels that applies to the interpretation system. By pressing the first select button again, the value becomes changeable.

```
>No. of channels:     27
```

Pressing the up/down buttons can alter the number of channels.

```
*No. of channels:     26
```

The new value must be accepted with the Enter button or discarded with the Menu button. Both buttons bring the user back to the "Interpreter setup" menu.

Values: {0, 1, 2, …, 31}

When selecting the value "0" no interpreted channels are available in the channel selectors. Only the Floor language is available.

When the number of languages are set to less that 31, only the selected number of languages are shown in the Units with Channel Selectors and in Interpreter Sets.

❑ ***Language setup***

The "Language setup" menu:

```
-Channel 1:     Arabic ?
-Channel 2:  Bulgarian
-Channel 3:     Danish
-Channel 4: Vietnamese ?
```

A channel entry is selected with the select keys 1-4 and the language for that channel can be chosen with the up/down buttons. If the value is changed is indicated with an "*" to the left of the entry.

The new language selection is accepted with Enter button and cancelled with Menu button.

## Delegate setup menu

The "Delegate setup" menu looks like this:

```
-Max Speakers:       2
-Max Requests:     100
-Operation Mode:  Auto
```

- ***Max Speakers***

The number of delegate microphone units, which are allowed to speak at the same time is defined as "Max Speakers".

Values: {1, 2, 3, 4, 5, 6, 7, 8}

Please observe, that a Chairman Unit can always be switched ON, regardless of the setting in Values: {1, 2, 3, 4, 5, 6, 7, 8}, however a maximum of 8 microphones can be open at the same time. I.e. if 8 Chairman Units are switched on, no Delegate Units can be switched on.

- ***Max Requests***

"Max Requests" defines how many delegate units that can be inserted into the list of delegates requesting to speak at the same time.

Values : {0, 1, …, 255}

- ***Operation Mode***

The "Operation Mode" determines the behaviour of the microphone system:

- Auto (or Automatic) mode allows for the microphone units to be switched on immediately upon pressing the microphone ON/OFF button.

  This is indicated by a red light in the 'Speak' lamp in the microphone unit. Pressing the microphone ON/OFF button again will turn the microphone off

  A Chairman Unit is always in Auto mode.

- Manual mode features a request list, where 'Delegates' are inserted in a queue upon pressing the microphone ON/OFF button. This is confirmed by green light in the 'Request' lamp in the delegate unit. It is possible to cancel the request by pressing the button again.

  The microphone can only be switched on from a PC running SW 6000 software or from a control system like AMX or Crestron. This will be indicated by red light in the 'Speak' lamp in the microphone unit. At this point the delegate can switch off the microphone by pressing the ON/OFF microphone button.

  It is <u>only</u> possible to use this mode if using with an attached PC running SW 6000 software or using with a control system.

- FIFO is an automated mode. The microphone unit functions in the same way as in *automatic* mode as long as the number of turned on delegate units is less or equal to the selected maximum speakers.

  When the max. number is reached, the next delegate pressing the *ON/OFF* button will be put in the top of the request queue. This is indicated by the green 'Request' lamp flashing slowly.

  More delegates will be put in the request queue when they press their ON/OFF buttons, until the maximum of requests is reached. Their green 'Request' lamps will light up steadily.

  When one of the turned ON microphone units is switched off, the first delegate unit in the queue is automatically switched ON, and the next delegate unit in the queue will flash with the green 'Request' lamp.

  This mode will normally be used with only 1 as maximum speakers.

Values: {Auto, Manual, FIFO}

## Configuration Menu

The "Configuration" menu comprises three menu items:

```
-Load setup
-Save setup
-Delete setup
```

❑ ***Load setup***

The "Load setup" item brings the user to the Load setup confirmation display:

```
This will overwrite
Current setup.
Continue?
```

The load is aborted with the Menu button and accepted with the Enter button. In both cases, the menu system returns to the Main menu.

❑ ***Save setup***

If the "Save setup" item is chosen this confirmation display is shown:

```
This will overwrite
setup in flash.
Continue?
```

If the user accepts the save the progress display is shown:

```
      Saving...
```

The display is shown for a few seconds before the CU returns to the "Main menu".

❑ ***Understanding "Save" and "Load" Setup***

When saving the configuration, the setting that has been done in the various menus in CU 6010, at the IS 6132 Interpreter Sets and at AO 6008 Audio Unit will be saved in the 'Flash' memory in the CU 6010.

Also the serial number and type of all units connected to the CU 6010 at the time of saving the configuration will be saved in the 'Flash' memory in the CU 6010.

When switching on power to the CU 6010 at a later stage, then the units connected will be compared to the saved configuration. If some units are not present, they will be reported as 'missing'

When 'loading' a configuration the last settings, which has been saved in the 'Flash' memory in the CU 6010 will be re-loaded to the CU 6010, to the IS 6132 Interpreter Sets and to the AO 6008 Audio Unit.

When switching the power to the CU 6010 OFF and then ON, the last saved setting will also be loaded.

## RS232 (RS422) setup menu

The RS232 setup menu consists of two setup issues:

```
-RS232 baud rate:  115200
-RS232 mode:      Default
```

❑ ***RS232 baud rate***

The "RS232 baud rate" determines the bit rate of the communication between the CU and an external unit connected via the RS232 or RS422 connection.

Values : {2400, 4800, 9600, 19200, 38400, 57600, 115200}

❑ ***RS232 mode***

The "Input mode" defines whether the ASCII communication via RS232/RS422 is protected by CRC check or not. By protecting the communication ("Protected"), the risk of faulty communication via RS232/RS422 is minimized. The risk of faults via RS232/RS422 is higher

running the "Default" mode, however, the communication is possible from standard interfaces.

The RS232 terminal interface emulator, Tera Term, does not feature the possibility of guarding the ASCII communication by CRC check.

Values: {Default, Protected}

### Firmware version menu

By choosing 'Firmware version' from the main menu information about the software version of the PowerPC and the DSP is shown:

```
PPC:                    5.1.1
DSP:                  0.0.19
```

The user returns to the main menu by pressing either the Menu button or the Enter button.

### Ambient noise setup menu

By choosing 'Ambient noise setup' from the main menu and parameters for an AM 6040 Ambient Noise microphone can be set up

The purpose of an ambient noise microphone is to provide sound from a meeting room/conference hall, when there is no delegate/chairman using their microphones.

Transmission of ambient noise rather than transmitting no sound at all is a desirable feature from listeners attending the meeting via headphones. The ambient noise indicates to the listeners, that there is no speaking activity going on, and this information is very nice to have, when interpreters are doing interpretation, and the speaker stops speaking.

The setup menu has the following options:

```
-Amb.Mic:           Enabled
-Amb.Mic Level:         0dB
```

- ***Amb.Mic***

When 'enabled is selected, the Ambient Noise Microphone is active.

- ***Amb.Mic Level***

Adjust the level of the microphone to a level, which is suitable for the listener (Interpreter).

Values: {Off, -40, -39, …,18, 19, 20}

The user returns to the main menu by pressing either the Menu button or the Enter button.

## Normal Operation

### Powering up

Switch on power at the CU 6010. After powering up, the display on the CU 6010 is showing the Start-up screen:

```
    Digital Conference
        System 6000
            DIS
```

After initialising the following screen is displayed:

```
-Loudspk volume:    0dB ?
-LineOut volume:    0dB
-Mic->Loudspk:      0dB
-Mic->LineOut:      0dB ?
```

This screen is the standard screen showed at normal use. This screen is automatically shown if no buttons is pressed in 15 seconds. The function of this screen is explained in the section **Audio Control menu.**

### Use with SW 6000

Please refer to the SW 6000 manuals.

## Schematics volume/gain settings

The volume controls, which can be set on the CU 6010 user interface as described in the previous section are shown in the following schematic.

- ***Setting of Loudspeaker volume***
  1. Set the *Mic>Loudspk* to 0dB
  2. Turn up the *Loudspk Volume* to the level needed in the loudspeakers.

- ***Setting Line input level***
  1. Apply the signal to the Input connector
  2. Turn up the input level on "LineInlevel Adj" until you can see the overflow indicator.

```
-LineIn->Loudspk:  -17dB ?
-LineIn->LineOut:   10dB
>LineInLevel Adj:*  -6dB
-Loudspk volume:    3dB ?
```

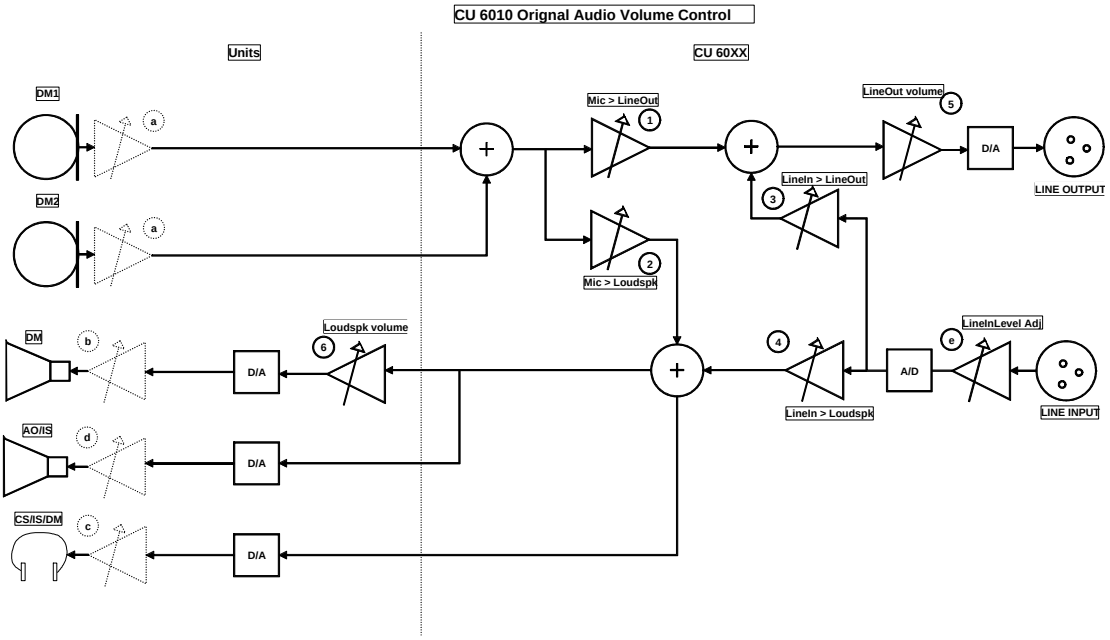
"*" Overflow indicator on line input

  3. Turn then the InputIn level down –8 dB to –12dB from the clipping level. Depending of the source connected, there might be different "overhead" needed. But normally 8-12 db is enough.
  4. Turn up the Linein >Loudspk Volume to the level needed in the loudspeakers

The principle is that the level of signal from the Line Input is combined of two settings:

*"LinelnLevel Adj"* and "*LineIn->Loudspk"*.

The *LinelnLevel Adj* has to be set as high as possible for maintaining the best S/N ration, but not too high to avoid clipping, whereas the *LineIn->LoudSpk* is used for setting the audio level needed in the loudspeakers.



# System Setup

## General guidelines

Connect the CU 6010 to the various DCS 6000 units using Cat5 or Cat5e FTP or STP screened cables.

The operation of the DCS 6000 units is found in the User Manual for the specific units.

Please observe the following guidelines:

- Maximum cable length in one chain is 200 m (before repeating). This includes interconnection cables between the units. The max. usable cable length depends on the units connected and length of feeding cables etc.
- Maximum cable length in one chain when using repeaters is 650 m.
- Although each of the outputs DCS-LAN Network Output connectors (A1, A2, B1 and B2) have a 100W supply, this 100W power is not all usable with long cables, as there will be a power drop in the feeding cable from the CU 6010 to the units connected. If the feeding cables are short and the cables between the units are short, more units can be connected than if the feeding cable is long and/or the cables are long between the units. Please consult the next section (Max. Number of units to be connected)
- The max. number of languages configured on chain A (A1 or A2) or B (B1 or B2) is 16. If more languages are required, Interpreter sets for those languages have to be divided between both chains (A and B). Normally the languages are supposed to be divided equally on chains A (A1 or A2) and B (B1 or B2).
- If the last unit in one chain is a CS 6032 Channel Selector, this unit has to be terminated with an external termination, as the CS 6032 does not have an internal automatic termination.

It is desirable that the square of the feeding cables especially, but also the interconnection cables are as big as possible to minimize the voltage drop in the cables. Cat 5/Cat5E cables are delivered in various gauges:

The following table is showing the Diameter/square for various AWG types:

| Type | Diameter | Square |
|---|---|---|
| AWG22 | 0.64 mm | 0.32 mm2 |
| AWG23/1 | 0.57 mm | 0.25 mm2 |
| AWG24 | 0,53 mm | 0.22 mm2 |
| AWG26 | 0,42 mm | 0.14 mm2 |

## Built into 19” Racks

The unit has a built-in fan taking air in at the right side of the unit and blowing the hot air out at the right side. That allows units in 19” racks to be stacked close with other units without extra room for cooling air between them. Please check that the other units will allow this.

# Max. number of units to be connected

The following tables show the maximum number of units, which can be connected to each of the four outputs (A1, A2, B1 or B2) on a CU 6010 Central Unit or on each output on an EX 6010 Extension Unit or on the output of a PS 6000.

## CM/DM 60x0P Chairman/Delegate Units

| Length of Feeding Cable Type CAT5 AWG24 | Length of inter connecting Cable, Type CAT5 AWG24 | Total cable length | Max. number of CM/DM 60x0 pr output |
|---|---|---|---|
| 10 m | 1 m | 51 m | 42 |
| 30 m | 1 m | 67 m | 38 |
| 50 m | 1 m | 83 m | 34 |
| 100 m | 1 m | 123 m | 24 |
| 150 m | 1 m | 165 m | 16 |
| 10 m | 2 m | 88 m | 40 |
| 30 m | 2 m | 98 m | 35 |
| 50 m | 2 m | 108 m | 30 |
| 100 m | 2 m | 142 m | 22 |
| 150 m | 2 m | 180 m | 16 |

## CM/DM 60x0P Chairman/Delegate Units & JB 6002 Junction Box

This configuration shows two CM/DM 60x0 Delegate/Chairman Units connected to one JB 6002 Junction Box with 3m cables between each JB 6002. Maximum 5 m cable from JB 6002 to CM/DM 60x0 and max. one CM/DM 60x0 on each output of JB 6002.

| Length of Feeding Cable, Type CAT5 AWG24 | Length of Cable between each JB 6002, Type CAT5 AWG24 | Total cable length | Number of JB 6002 | Max. number of DM 60x0 |
|---|---|---|---|---|
| 10 m | 3 m | 61 m | 18 | 36 |
| 30 m | 3 m | 75 m | 16 | 32 |
| 50 m | 3 m | 89 m | 14 | 28 |
| 100 m | 3 m | 127 m | 10 | 20 |
| 150 m | 3 m | 168 m | 7 | 14 |

## CM/DM 6060F/6510F Chairman/Delegate Units

The following tables show the maximum number of units, which can be connected to each of the four outputs (A1, A2, B1 or B2) on a CU 6000 Central Unit or on each output on an EX 6010 Extension Unit or on the output of a PS 6000.

.

| Length of Feeding Cable Type CAT5 AWG24 | Length of inter connecting Cable, Type CAT5 AWG24 | Total cable length | Max. number of CM/DM 60x0 pr output |
|---|---|---|---|
| 10 m | 1 m | 39 m | 30 |
| 30 m | 1 m | 56 m | 27 |
| 50 m | 1 m | 73 m | 24 |
| 100 m | 1 m | 115 m | 16 |
| 150 m | 1 m | 160 m | 11 |
| 10 m | 2 m | 64 m | 28 |
| 30 m | 2 m | 78 m | 25 |
| 50 m | 2 m | 94 m | 23 |
| 100 m | 2 m | 130 m | 16 |
| 150 m | 2 m | 170 m | 11 |

## CM/DM 6560F Chairman/Delegate Units

| Length of Feeding Cable Type CAT5 AWG24 | Length of inter-connecting Cable, Type CAT5 AWG24 | Total cable length | Max. number of CM/DM 60x0 pr output |
|---|---|---|---|
| 10 m | 1 m | 35 m | 27 |
| 30 m | 1 m | 53 m | 24 |
| 50 m | 1 m | 70 m | 21 |
| 100 m | 1 m | 113 m | 14 |
| 150 m | 1 m | 159 m | 10 |
| 10 m | 2 m | 58 m | 25 |
| 30 m | 2 m | 72 m | 22 |
| 50 m | 2 m | 88 m | 20 |
| 100 m | 2 m | 126 m | 14 |
| 150 m | 2 m | 166 m | 9 |

## MU 6040 C/D without connected loudspeaker

This table shows the maximum number of MU 6040 Microphone Units, which can be connected. The numbers are with no audio in loudspeaker (no loudspeaker connected to each unit). If loudspeakers are used, then use the figures for CM/DM 60x0 above.

| Length of Feeding Cable, Type CAT5 AWG24 | Cable length between each MU 6040 | Total cable length | Max. number of MU 6040 |
|---|---|---|---|
| 10 m | 2 m | 168 m | 80 |
| 30 m | 2 m | 178 m | 75 |
| 50 m | 2 m | 188 m | 70 |
| 100 m | 2 m | 200 m (202 m) | 51 (52*) |
| 150 m | 2 m | 200 m (232 m) | 26 (42*) |
| 100 m | 1 m | 151 m | 52 |
| 150 m | 1 m | 191 m | 42 |

Numbers in (‘) are the number of units, which could have been connected CU/EX, but where the total number of units has been lowered due to the restriction of the maximum length of cable (200 m).

## IS 6132P Interpreter Units

This table shows the maximum number of IS 6132P Interpreter Sets, which can be connected. The numbers are with no audio in loudspeaker (no loudspeaker connected to each unit).

If loudspeakers are used, then use the figures for CM/DM 60x0 above.

Note: The number of units is dependant of how many interpreter sets there are per booth (or language), as there only can be one set switched ON per language (channel).

| Length of Feeding Cable, Type CAT5 AWG24 | Length of inter-connecting Cables, Type CAT5 AWG24 | Max. number of units pr output All ON | ½ ON | 1/3 ON |
|---|---|---|---|---|
| 10m | 2 m | 54 | x | x |
| 30m | 2 m | 49 | 57 | 60 |
| 50m | 2 m | 44 | 51 | x |
| 100m | 2 m | 35 | 40 | x |
| 150m | 2 m | 25 | 30 | x |

## IS 6132P w/JB 6004 and LS 6032

| Length of Feeding Cable, Type CAT5 AWG24 | Length of cable between booths | Number of booths | Number of IS 6132/ booths | Number of LS 6032/ booths |
|---|---|---|---|---|
| 10 m | 5 m | 19 | 4 | 0 |
| 10 m | 5 m | 12 | 4 | 4 |
| 30 m | 5 m | 17 | 4 | 0 |
| 30 m | 5 m | 10 | 4 | 4 |
| 50 m | 5 m | 15 | 4 | 0 |
| 50 m | 5 m | 9 | 4 | 4 |
| 100 m | 5 m | 11 | 4 | 0 |
| 100 m | 5 m | 7 | 4 | 4 |
| 150 m | 5 m | 8 | 4 | 0 |
| 150 m | 5 m | 5 | 4 | 4 |

## CS 6032F Channel Selector w/back light on

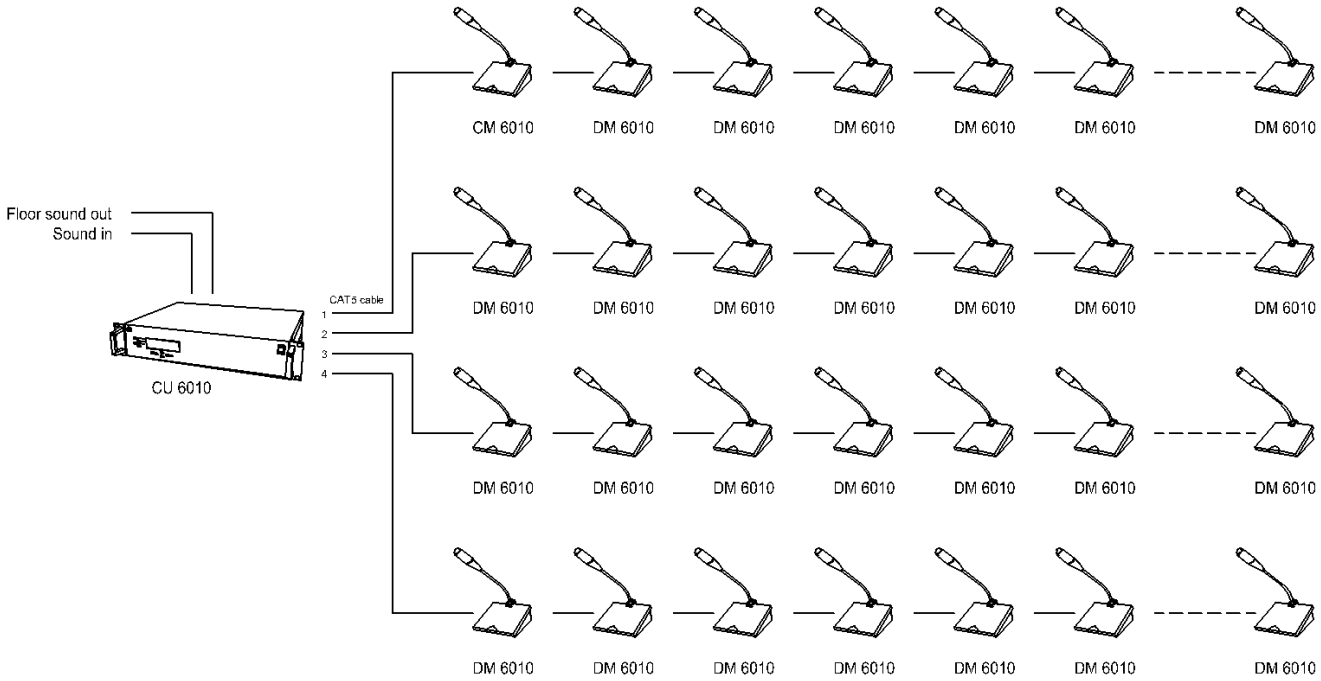
| Length of Feeding Cable Type CAT5 AWG24 | Length of Inter-connecting cable, Type CAT5 AWG24 | Total cable length | Max. number of CS 6032 pr output |
|---|---|---|---|
| 30 m | 1 m | 139 m | 110 |
| 50 m | 1 m | 144 m | 95 |
| 100 m | 1 m | 184 m | 85 |
| 150 m | 1 m | 200 m | 51 (67') |
| 10 m | 2 m | 200 m | 96 |
| 30 m | 2 m | 200 m | 86 (90') |
| 50 m | 2 m | 200 m | 76 (85') |
| 100 m | 2 m | 200 m | 51 (70') |
| 150 m | 2 m | 200 m | 26 (60') |

Numbers in (') are the number of units, which could have been connected to the CU/EX, but where the total number of units has been lowered due to the restriction of the maximum length of cable (200 m).

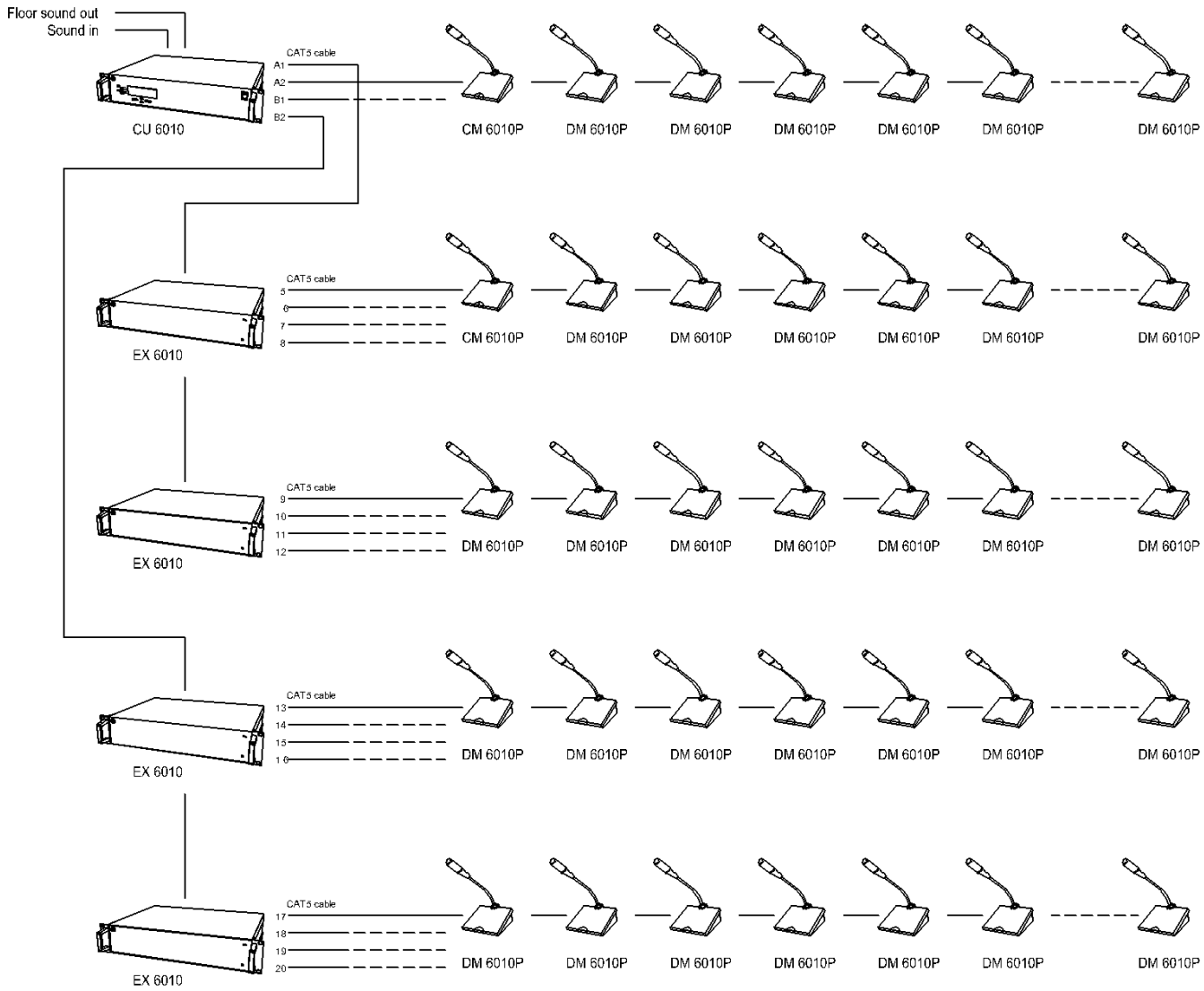
# Typical schematics

The following schematics are showing various configurations:

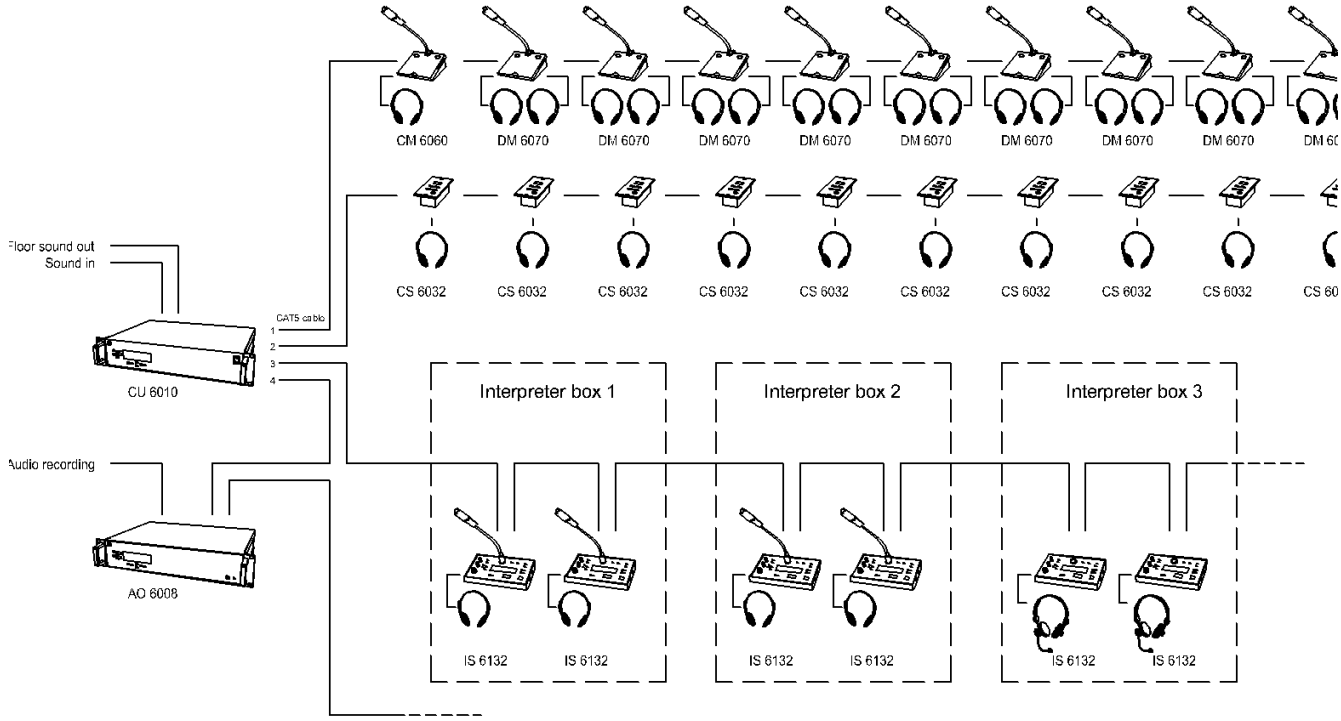
## Small conference microphone system



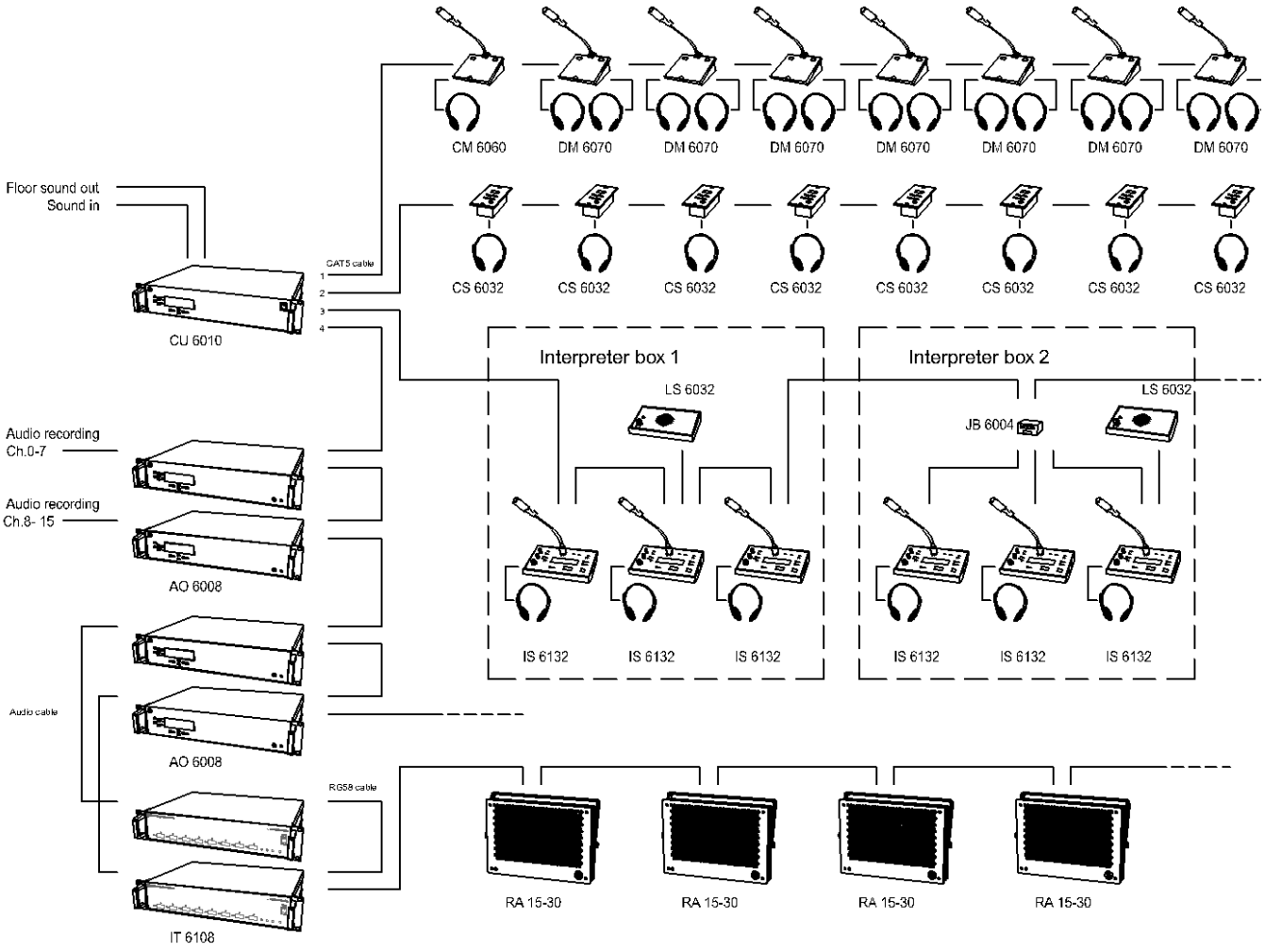
## Large size conference microphone system



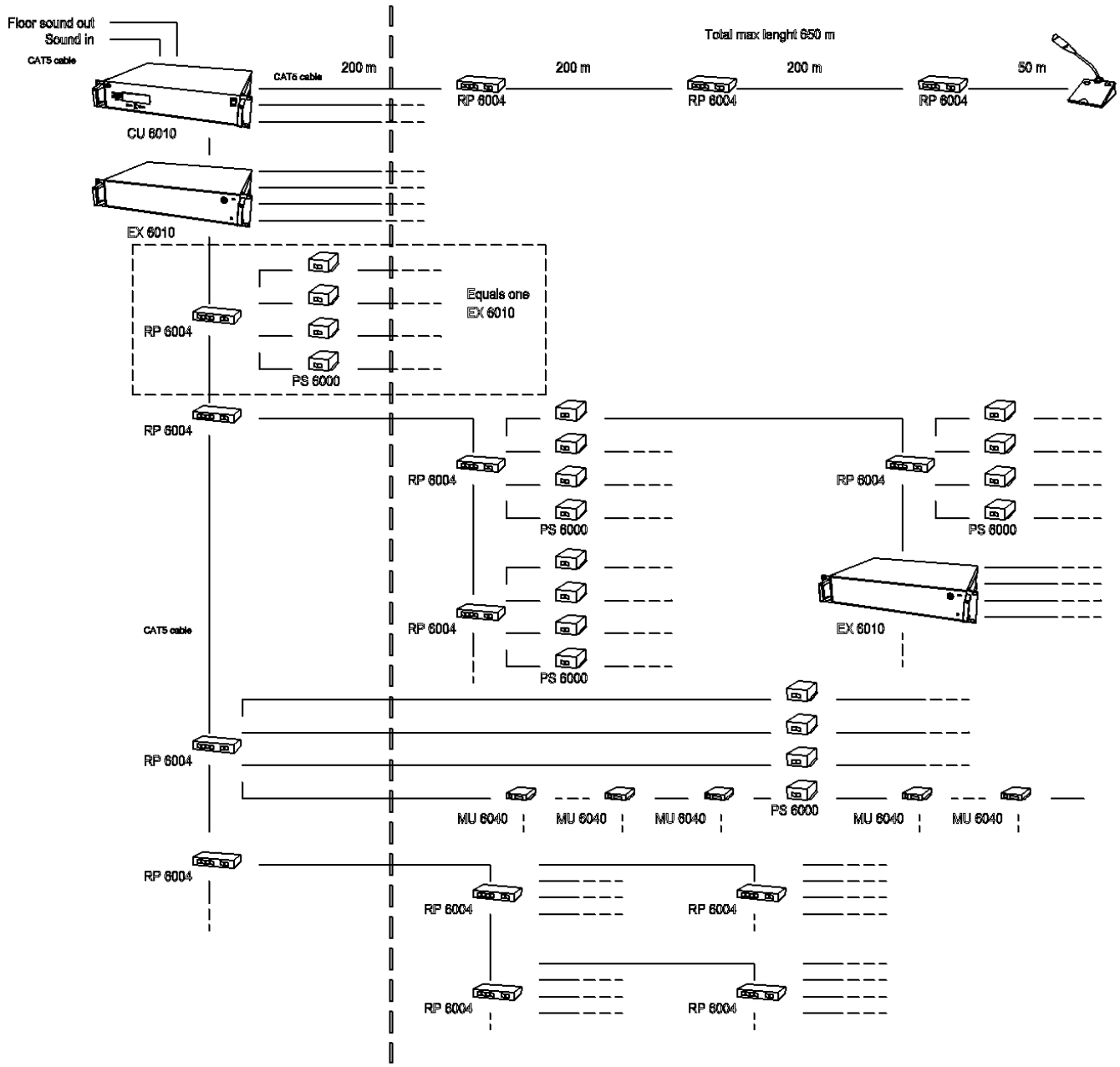
## Microphone conference system with interpretation



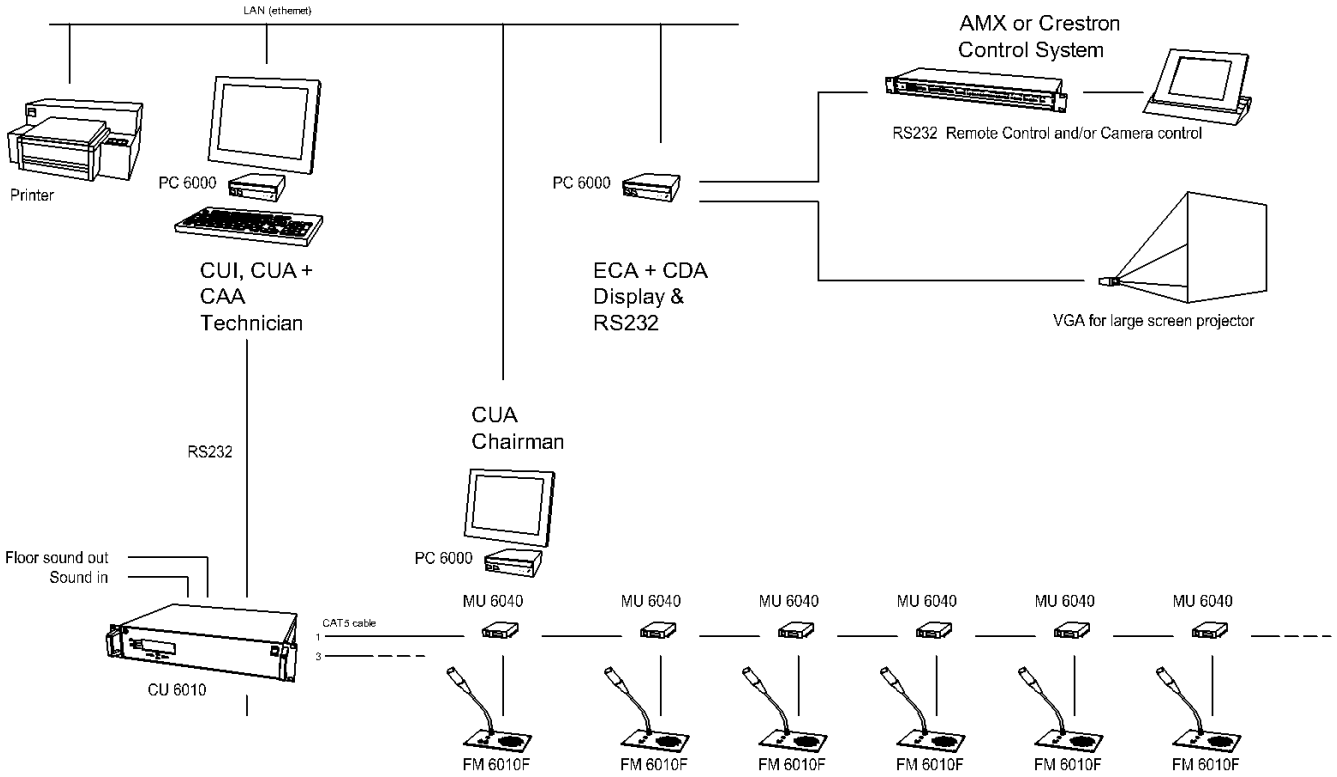
## Microphone conference system with interpretation & IR



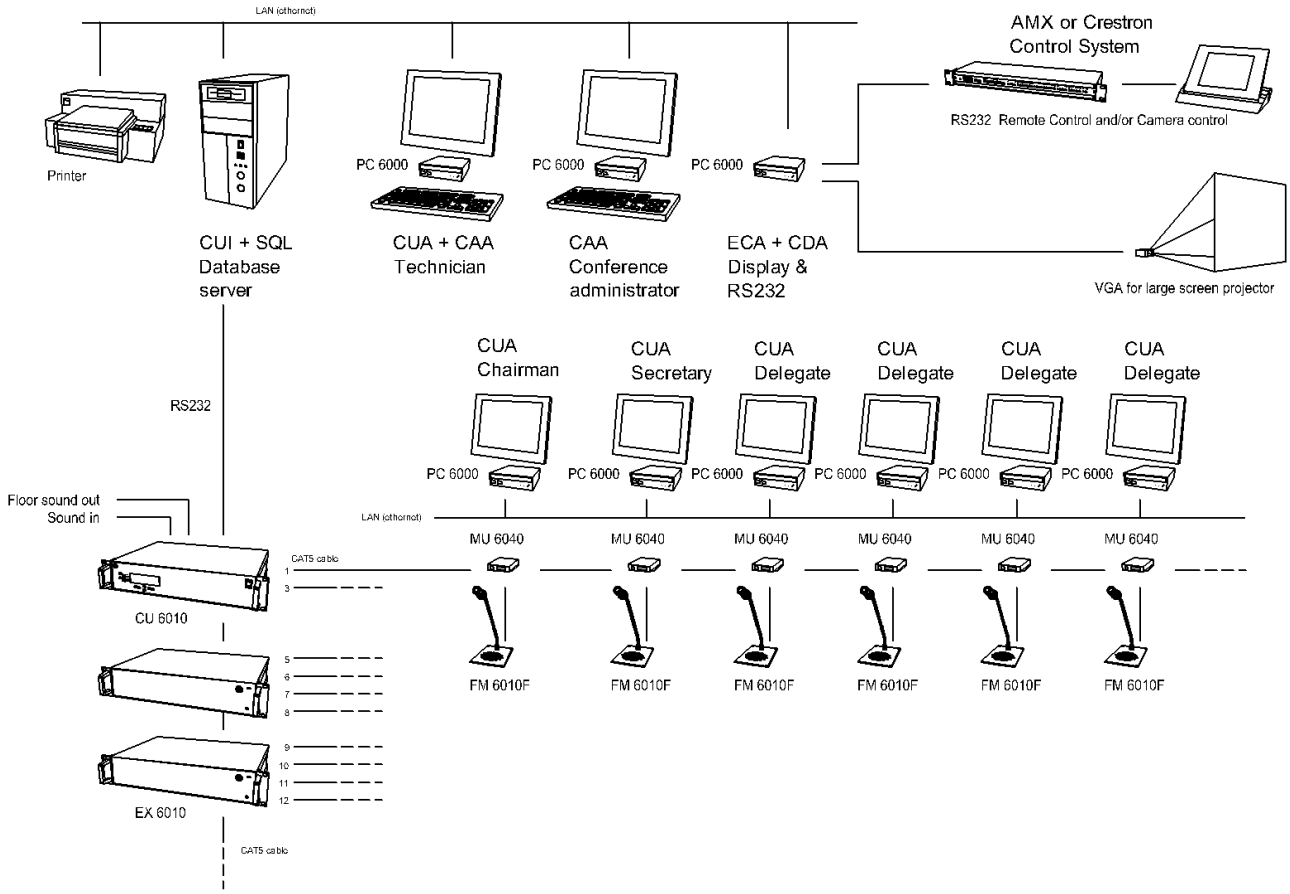
## Various configurations with RP 6004 Repeater and PS 6000 Power Supply



## Small system with SW 6000 User Interfaces



## Large system with SW 6000 User Interfaces



# Appendix

## Technical appendix

### Cabling

#### CAT5

The DCS 6000 system uses CAT5, CAT5e or CAT6 FTP or STP cables with screened RJ45 connectors.

EIA 568-B wiring shall be used.

**It is important to use only FTP or STP (screened) cables and screened RJ45 connectors and not UTP cable, which is unscreened.**

How to wire a CAT5 (EIA 568-B) Cable:

| Pin | Function | Connector #1 | Connector #2 |
|---|---|---|---|
| 1 | In-going + | ORG/WHT | ORG/WHT |
| 2 | In-going - | ORG | ORG |
| 3 | +48V | GRN/WHT | GRN/WHT |
| 4 | 0V | BLU | BLU |
| 5 | 0V | BLU/WHT | BLU/WHT |
| 6 | +48V | GRN | GRN |
| 7 | Outgoing - | BRN/WHT | BRN/WHT |
| 8 | Outgoing + | BRN | BRN |

Note. If other colour codes are used then the four pairs are connected as follows:

Pair 1: Pin 1 & 2

Pair 2: Pin 3 & 6

Pair 3: Pin 4 & 5

Pair 4: Pin 7 & 8

The phase of the pairs must be correct and the wiring spec. as stated in CAT5 (EIA 568-B) have to be followed.

Note: CAT6 cables can normally only be terminated in sockets (female) and not in cable plugs.

CAT6 can thus only be used for longer cable draws terminating in wall outlets or patch panels.

#### RS 232 Serial connection

| Pin | RS232 on CU 6010 D9S | Pin | RS232 on PC D9P |
|---|---|---|---|
| 1 | * | 1 | DCD |
| 2 | TxD | 2 | RxD |
| 3 | RxD | 3 | TxD |
| 4 | * | 4 | DTR |
| 5 | 0V | 5 | 0V |
| 6 | * | 6 | DSR |
| 7 | RTS | 7 | CTS |
| 8 | CTS | 8 | RTS |
| 9 | | 9 | RI |

Connect all pins in the connectors: Pin 1 to Pin 1, Pin 2 to Pin 2, Pin 3 to Pin 3 and so on.

* Pin 1, 4 and 6 are connected together inside the CU 6010.

#### RS 422 Serial connection

| Pin | RS422 on CU 6000 D9P | Pin | RS422 on PC |
|---|---|---|---|
| 1 | RXD+(B) | 1 | |
| 2 | RXD-(A) | 2 | |
| 3 | TXD-(A) | 3 | |
| 4 | TXD+(B) | 4 | |
| 5 | 0V | 5 | |
| 6 | RTS-(A) | 6 | |
| 7 | RTS+(B) | 7 | |
| 8 | CTS+(B) | 8 | |
| 9 | CTS-(A) | 9 | |

Note. There is no standard for the pin layout of the RS422. Please consult the manual for the RS422 card in your PC or control system.

**Important**

Please observe, that either the RS232 Serial Connection or the RS422 Serial Connection can be used. It is not possible to use both at the same time.

## Analog Audio, Line output (XLR3 male)

| Pin | Signal | Cable type |
|---|---|---|
| 1 | Ground | DIS type #2914 or 2 x 0,25 $mm^2$ shielded. |
| 2 | In phase signal | |
| 3 | Out phase signal | |

## Analog Audio, Line Input (XLR3 female)

| Pin | Signal | Cable type |
|---|---|---|
| 1 | Ground | DIS type #2914 or 2 x 0,25 $mm^2$ shielded. |
| 2 | In phase signal | |
| 3 | Out phase signal | |

## Accessories (not supplied)

**Cat 5 Connection Cables (AWG24)**

EC 6000-..5 Connection Cable 0,5 m.....10 03 12500

EC 6000-01 Connection Cable 1 m.....10 03 13101

EC 6000-02 Connection Cable 2 m.....10 03 13201

EC 6000-05 Connection Cable 5 m.....10 03 13501

EC 6000-10 Connection Cable 10 m.....10 03 14102

EC 6000-20 Connection Cable 20 m.....10 03 14202

EC 6000-50 Connection Cable 50 m.....10 03 14502

**RS232 cables**

EC 4010-05 Connection Cable 1 m.....15 51 05563

EC 4010-05 Connection Cable 2 m.....15 51 05564

EC 4010-05 Connection Cable 5 m.....15 51 05565

EC 4010-05 Connection Cable 10 m.....15 51 05566

# Technical specifications

## Digital Section

Sound quality ..... 24 bit audio @ 32 kHz sampling frequency

## Analogue Section

Floor output signal type ..... electronic balanced

Nominal output level: ..... 0 dBm at nominal input

Nominal output level ..... -8 dBm at nominal input

Max. output level ..... 3,5V RMS ~ +13 dBm

Line input signal type ..... electronic balanced

Max. input level ..... +30 dBm

Input impedance ..... 100 kohm

Frequency response ..... 50-15kHz

Signal to noise ratio: ..... >85 dBA

Total harmonic distortion: ..... < 0.1%

## General

Power consumption ..... max. 600VA

In-rush current ..... max. 30A@115V or max. 60A@230V

Mains voltage: ..... 100 - 240V, 50 - 60Hz

Supply voltage for units (for each: A1, A2, B1, B2) .48V/125W

Temperature to guarantee specified performance

..... 5 Deg C. to 40 Deg C. (35 to 80% humidity)

Storage temperature

..... -20 Deg C. to 60 Deg C. (10 to 80% humidity)

Weight ..... 4,5 kg

Dimensions (W x H x D)..... 425 (483) x 87 x 317 (357) mm

dimensions in bracket are including 19” brackets

Accessories supplied ..... User manual

..... Mains cable

..... 5 pieces termination plugs

## Connectors

DCS 6000 network chain (DCS-LAN) ..... 4 pieces RJ45

Max. number of units to be connected to <u>each chain</u>:

MU 6040 Microphone Units ..... up to 80 pieces

DM/CM 60x0P Delegate/Chairman Unit ... up to 42 pieces

IS 6132P Interpreter Set ..... up to 54 pieces

CS 6032F Channel Selector ..... up to 110 pieces

The actual max. number of units depends on the length of the feeding cable and interconnection cables

Line output ..... XLR3 male connector

Line input ..... XLR3 female connector

RS 232 (with hardware handshake) ..... D-Sub 9 female

RS 422 (with hardware handshake ..... D-Sub 9 male

..... either the RS232 or the RS422 can be used

## System performance with CU 6010 as central unit

Max. number of units (excl. CS) ..... 1000

Max. number of IS 6xxx in one booth ..... 32

Max. number of IS 6xxx ..... 150

Max. number of AO 6008 ..... 20

Max. number of CS 6032 ..... practically unlimited

Max. number of languages ..... 31

Max number of open microphones ..... 8

## Max. system performance

Max. number of units (excl. CS) ..... 4000

**The DCS 6000 system conforms to all relevant standards - e.g. IEC 914, ISO 4043, and ISO 2603**

**Specifications are subject to change without notice.**